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LITHOPEDION

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REPRINTED FROM
THE AMERICAN JOURNAL
OF OBSTETRICS AND DISEASES OF
WOMEN AND CHILDREN
VOL. LXV, No. 1, 1912

NEW YORK
WILLIAM WOOD & COMPANY, PUBLISHERS
1912







REPORT OF A CASE, WITH A REVIEW OF THE LITERATURE.

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(With six illustrations.)

REPORT OF CASE.

CASE.—Mrs. M. D., aged fifty-four years. Widow for fourteen years. Three children, one miscarriage; last child born twenty-four years ago. Menstruation perfectly regular from the time of birth of last child, until it suddenly ceased, at the menopause, four years ago. No period missed during the intervening years, and nothing to suggest another pregnancy. The miscarriage was the third pregnancy, one child being born afterward. Following the birth of the last child the abdomen, which was unusually large during pregnancy, remained larger than it had been previously. The patient was a large woman, so that no significance may have attached to this fact. She was always well and strong, except for some indigestion, and palpitation of the heart, apparently of purely functional origin.

The patient consulted me, February 10, 1911, giving a history of having noticed a lump in the lower abdomen two years before, which she thought had been increasing in size of late. She had been receiving electrical treatment "to absorb it," and had also been given large amounts of various medicines.

Physical examination revealed what was supposed to be multiple fibroids of the uterus. Four distinct tumors were felt, two of which seemed rather sharp than rounded. A mass the size of an adult human head extended up almost to the free border of the ribs, on the right side, across toward the bladder in front and the rectum behind. Adhesions between the tumor and the intestines could be made out.

The tumor simulated a fibroid connected with the uterus, seeming like a tumor from the fundus, but it was peculiar in that it was very hard, and that two sharp projections could be distinctly felt. The diagnosis was made of fibroid tumor of the uterus, with calcareous degeneration.

Some varicose spots were noted in the veins of the legs. No appreciable atheroma in palpable vessels. Heart and lungs apparently normal; urine normal.

Early hysterectomy advised. Patient admitted to the New York Skin and Cancer Hospital, February 8, 1911. Laparotomy, February 20. Median incision, through right rectus. The mass

¹ Presented before the Twenty-four Annual Meeting of the American Association of Obstetricians and Gynecologists, held at Louisville, Ky., September 26-28, 1911.

in the lower portion of the abdomen was found to be adherent to the left tube and ovary. All around the mass was an apron of omentum, and to the upper portion of the mass the transverse colon was adherent.

The supposed multiple fibroids proved to be a lithopedion, the large mass being the head, the two sharp tumors the elbows, and the fourth mass presumably one of the knees.

The accompanying photographs, by the official photographer of the hospital, were taken as the lithopedion was being delivered. Figures 1, 2, and 3, show successive stages of delivery. Figures 4 and 5 show the lithopedion in different aspects.

The patient was returned to bed in very fair condition. Because of the severe traumatism to the peritoneum and the forcible breaking up of the many adhesions in the removal of the tumor, she was kept on a very light diet, and was making an uneventful recovery, with heart and lungs in excellent condition. She would have been discharged within a day or two, when, on March 9, seventeen days after the operation, sudden death occurred, under the following circumstances, which, though in no wise associated with the operation or related to the lithopedion, are nevertheless sufficiently interesting to warrant a report.

On the afternoon of March 9, friends and relatives called and gave the patient some apples and peanuts, which were carefully secreted under her pillow. At 8.30 that night she ate some of these, which caused severe vomiting, with violent retching. At 8.59 she died.

The autopsy findings showed pulmonary congestion; atheroma of the coronary arteries; air emboli and clots in the anterior coronary arteries; chronic nephritis.

As may be judged from the accompanying illustrations, the fetus was of about seven months' development, the body being fairly well formed. The lithopedion weighs $2\frac{3}{4}$ pounds.

Inasmuch as the woman (of whose moral status there is no question) had been a widow for fourteen years, the lithopedion had been carried for at least that length of time. Inasmuch, too, as she had not missed a menstrual period from the time of its establishment after the birth of the last child, twenty-four years before, the lithopedion had presumably been carried for that length of time. There was apparently no connection between the lithopedion and the miscarriage, which took place before the last pregnancy. It would seem, therefore, that the lithopedion was the result of a superfetation at the time of the last pregnancy. A small scar, found in the left tube just where the head lay, led to the conclusion that perhaps a tubal pregnancy occurred simultaneously with the uterine pregnancy, that this tube ruptured at an early stage, and that extratubal development continued up to about seven months, calcification of the extratubal fetus taking place after that time, the intrauterine fetus going on to full term in a normal manner. The calcifica-

tion may have begun at an early stage of development, proceeding so slowly that growth was not completely checked until about the sixth month. This is purely speculative, however.

The specimen is a true lithopedion, according to the generally accepted classification. x-ray examination failed to give any evidence to the contrary.

This case of lithopedion happens to be the first which I have encountered in a large gynecological practice and in a comprehensive obstetrical experience, the latter obtained in part during an internship at the Sloan Maternity Hospital. My interest in the subject was specially aroused, and a careful review of the literature was made, a synopsis of which is given below.

THEORIES OF FORMATION.

In reviewing the literature of the subject I found that there is quite a diversity of opinion concerning the classification of these formations. It may not be without interest to some of the readers of this contribution to review the chief theories concerning the etiology, development, and classification of the calcified fetus and its membranes.

Gould and Pyle (*Anomalies and Curiosities of Medicine*), give the following reference to the subject: "Israel Spach, in an extensive gynecological work, published in 1557, figures a lithopedion drawn *in situ* in the case of a woman with her belly laid open.

"He dedicated to this calcified fetus, which he regarded as a reversion, the following curious epigram, in allusion to the classical myth that after the flood the world was repopulated by the two survivors, Deucalion and Pyrrha, who walked over the earth and cast stones behind them, which, on striking the ground, became people. Roughly translated from the Latin, the epigram read as follows: 'Deucalion cast stones behind him and thus fashioned our tender race from the hard marble. How comes it that nowadays, by a reversal of things, the tender body of a little babe has limbs nearer akin to stone?'"

Küchenmeister (Ueber Lithopedion—*Archiv. f. Gyn.*, vol. xvii, p. 153, 1881), gives the most generally accepted theory concerning the formation of lithopedion, and the most widely accepted classification of the petrified or calcified products of conception. He classifies them, according to the extent and manner of calcification, as lithokelyphos, lithopedion, and lithokelyphopedion.

Lithokelyphos, according to Küchenmeister, originates in such way that the ovum as a whole, meaning the unruptured membranes and the fetus, is discharged into the abdominal cavity. This results in peritonitis, the products of which (masses of exudate) serve to strengthen the fetal membranes from without. The local organization of the exudate leads to the formation of strands and adhesions with neighboring organs, while the exudates that have been deposited on the fetal membranes themselves gradually undergo fatty degeneration; after this is completed, calcification follows, forming a stony capsule



FIG. 1.—Step in operation.

around the fetus, after the fluid which surrounds it has become absorbed. The fetus itself is involved in the calcification only at those points where adhesion between the fetus and its membranes has occurred during fetal life. As a rule the fetus is probably cast out dead in its membranes into the abdominal cavity. Sometimes this may happen in the course of diminishing viability, at a time when the locally adherent fetal membranes are still connected with the pseudouterus, the fetus promptly dying under the absorption of the waters.

Lithopedion originates in such way that, after the waters have escaped through a large tear, at the rupture of the fetal envelope, perhaps also of its pseudouterine sheath, the mem-

branes become wrapped around the fetus, the calcification beginning in the vernix caseosa between the fetus and the fetal membranes. In these cases a part of the fetal membranes may become detached from the placenta, and become twisted in strands as far as the point where the untorn membranes are wrapped around the fetus, after the fetus itself has been torn away from the umbilical strand and the placenta. It is not impossible, theoretically, according to Küchenmeister, for an entirely detached fetus to lodge in some place in the abdominal cavity, giving rise to local peritonitic exudates, and to receive



FIG. 2.—Step in operation.

a secondary envelope, without fetal membranes, in the course of time, after the exudates have been organized. Such an occurrence can be decided only by anatomico-microscopical findings in the sheath, in a given case. If the fetus is still in some way connected with the fetal membranes, it might possibly survive for some time after the rupture of the membranes, to which it is partially attached.

Lithokelyphopedion can be formed only in a case of a fetus which was already adherent to its membranes during fetal life.

Küchenmeister gives twenty-three cases of lithokelyphos, dating from 1728 to 1880; three cases of lithokelyphopedion, dating from 1582, 1659, and 1720; nineteen cases of lithopedion, dating from 1661 to 1877.

Freund (*Beitrage zur Geburtshilfe u. Gynaekol.*, vii, 1903), says the etiology of lithopedion formation has been referred by some observers to purely physiological causes. The theory propounded by Kroemer is considered very plausible by Freund. According to Kroemer the dry metamorphosis is introduced by the withdrawal of the amniotic fluid and of the body-juices, this taking place more rapidly in proportion to the absorptive power of the surroundings. Hence this is more likely to occur in the peritoneal cavity, not so easily in tubal pregnancies, rarely or perhaps never in the uterus. Freund, in continuing this explana-



FIG. 3.—Step in operation.

tion, points out that the absorptive power of the surroundings is in its turn dependent on its capacity for reaction, meaning that the condition must be favorable for adhesions of the dead ovum with the fetal sac. This is the case where the sac consists mostly of connective tissue, muscle tissue, elastic fibers, and mucous membranes with their epithelium, being much less suitable for this purpose, or not at all. The scanty uterine lithopedia were not accepted by Webster (1896), who interpreted them as very probably of interstitial origin.

Next to these cases, the pregnancies in a so-called horn of the uterus enter into consideration, the interstitial and true tubal pregnancies following next in order. Apoplectic bloody extravasates around the ovum, and pathological loss of epithelium,

according to Freund, perhaps play an essential predisposing part for adhesions, especially as the connective tissue element in the sac wall progressively predominates with the further advance of all tubal pregnancies.

In the remaining ectopic gestations, the tuboovarian, tubo-abdominal, ovarian, and especially abdominal type, the pre-



FIG. 4.—Lithopedion. Front view.

dominant or pure connective-tissue character of the sac is sufficiently pronounced to explain the adhesions to the surroundings, which are responsible for the absorption and the excretions of the lime-salts, in consequence of the improved circulation through the inflammatory stimulus of the dead body.

The age of the fetus, according to Freund, in old ectopic gestations, is by no means easy of determination. In the most

favorable cases the anatomical findings (chiefly the length and development of the individual bones) are assisted by a good history, which clearly shows the onset of labor at the calculated term.

The weight of the reported lithopedions is not proportionate to the age of the fetus, and still less to the time of the retention. Oppel thinks the weight varies according to the stage of absorp-



FIG. 5.—Lithopedion. Side view.

tion or calcification, but reaches its greatest height in the third decade and the beginning of the fourth decade after pregnancy. Freund does not accept this interpretation, in view of the enormous difference in weight of the individual reported cases. He admits that the age of the fetus, and the mass of deposited lime salts, furnish the main factors in the increase in weight. A definite system cannot be formulated, however, especially as the second factor, in his opinion, depends principally upon local

causes, in a given case, such as extent and importance of the adhesions, and especially circulatory relations.

The outcome of lithopedion formation may be *suppuration*,



FIG. 6.—Radiograph of lithopedion.

although this is less apt to occur than in other extra-uterine pregnancies. There is a possibility of infection from adherent intestines. Infectious diseases are very apt to induce suppuration of all tumors, including lithopedion. Pressure-

necrosis, with subsequent secondary infection from the outside, may give rise to suppuration.

The carriers of lithopedions are remarkably free from troublesome symptoms, according to Freund. Cases are on record which remained perfectly free from disturbances for many years, when fistula formation, suppuration, and marasmus followed. Others suffered from minor disturbances, pain on change of position, or during defecation; digestive disturbances, etc. In some of the reported cases the unrecognized pregnancies terminated in more or less severe peritonitis, from which the patients recovered and remained free for the period of thirty and eleven years respectively in two cases, finally being compelled by dangerous abdominal symptoms to undergo operation.

Subsequent pregnancies and deliveries have been known to occur without trouble of any kind. In Kroemer's case there were three spontaneous abortions, in Freund's case there followed one natural birth, and in Leopold's case three easy confinements occurred while the lithopedion was being carried.

Among eleven cases compiled by Freund, six women (54 per cent.) reached a very advanced age without an operation. Among the remaining five, three recovered, and two died, after operative intervention (Freund's and Hammer's cases). In these two instances the therapeutic measures were greatly hindered by suppuration and cachexia, which terminated in death.

Lithokelyphopedions perforate as the result of pressure erosion, and usually do not undergo suppuration until secondarily, through germs entirely from the outside. The more connective-tissue-like the ectopic sac, and the more vascular its adhesions, the more likely are mummification and calcification of the entire ovum to occur.

The diagnosis of lithokelyphopedion is based upon calcification of the fetal membranes, and adhesions of the same with the fetus, which is likewise calcified, especially at the points of contact.

Werk (*Winchel's Handbuch der Geburtshilfe*, vol. ii, Part I, Wiesbaden, 1904), says calcification is the terminal stage in the series of changes undergone by the product of conception, when decomposition fails to occur.

The most detailed description of the calcification process, still admitted as correct in all the essential features, according to Werk, was contributed by Kieser, in his Inaugural Dissertation, Stuttgart, 1854. The latter described a lithopedion which

is still preserved in the collection of the Women's Clinic, in Tübingen. The specimen was obtained in 1720, at the autopsy of a woman ninety-four years of age. It was derived from an ectopic pregnancy in the year 1674, which is said to have been followed by two births at term. The fetus was much bent and folded, enclosed in a capsule of lime, covered on the outside with dry pseudo-membranes. Part of the surface of the fetus was adherent to the inner surface of the capsule. The superficial soft parts of the fetus were calcified in the area of the adhesions, while the fetus was otherwise in a state of simple mummification.

On the basis of the examination of this specimen, and careful study of the available cases up to 1854, Kieser arrived at the conclusion that in the formation of so-called lithopedion the deposit of calcium begins in the maternal envelope, and only secondarily involves the fetus (previously mummified), and only in those parts which are in contact with the covering layer.

Referring to Küchenmeister's work (op. cit.), Kieser gives the following exposition of the classification of the calcified products of conception: 1. Cases in which only the maternal envelope or sheath is calcified, whereas the fetus is simply mummified, and not adherent to the former—*Lithokelyphos* (from a Greek word meaning egg-shell). 2. Cases in which the calcification has also involved the fetus, which is adherent to the coverings—*Lithokelyphopediton*. 3. Cases in which the fetus alone is the seat of lime deposits. These are said to concern invariably a fetus lying free in the abdominal cavity, the vernix caseosa supplying the foundation for the calcium deposits, which form a crust of progressive thickness around the shrinking fetus—*true lithopedion*.

Küchenmeister's article, according to Kieser, did not materially contribute to the knowledge of the pathologico-anatomical character of so-called lithopedion, but laid more stress on the several varieties, and also enriched the obstetrical terminology in the nomenclature of these subdivisions. This utilization of the available material in the literature, in support of the division proposed by him, was considered by Kieser to be somewhat arbitrary. The type designated by Küchenmeister as lithokelyphopediton (for which he was unable to quote more than three examples, two inaccurate and arbitrary), is undoubtedly, in Kieser's opinion, the most common of all. He refers in this connection to the eleven cases cited by Freund (op. cit.)

and expresses the opinion that this number could doubtless be increased by other examples.

Kieser holds that the majority of cases of lithokelyphos were not examined thoroughly enough to exclude a partial participation of the fetus in the petrification. Hence the occurrence of this type is probably much less common than appears to be the case according to Küchenmeister. He also considers the third type, true lithopedion, to be represented by Küchenmeister in too voluminous a group. Almost all the cases grouped under this heading concern an abdominal fetus, as a rule with extensive peritoneal adhesions and pseudomembranous coverings. The latter are usually interpreted as fetal membranes, though it is considered by some to be a secondary envelope. This envelope represents the matrix for the introduction of lime into the fetal body itself.

Concerning the *source of the lime salts* (calcium carbonate and phosphate) excreted into the fetus and its coverings, Kieser holds that the salts deposited in the fetus itself as well as its coverings must have been supplied from the outside, as the fetal body does not contain enough soluble calcium salts in its body-juices to permit the formation of macroscopical deposits. The supply of lime salts can therefore take place only through the maternal blood current and juices, and the formation of deposits can occur only in areas which are still within the reach of the latter. It has been known, since the days of Virchow, that the occurrence of the calcification-process requires for its basis, besides the presence of necrotic tissue, also a diminished circulation, as to the velocity and extent of the flow.

This condition is met with in the walls of old closed amniotic sacs, as well as in the secondary coverings of a fetus that has been originally free in the abdominal cavity. For, in the course of retention of the dead fetus, as Kieser points out, the specific stimulus of pregnancy, which dominates the development of the bloodvessels, progressively loses in efficiency, while the peritoneal irritability gradually subsides, all this being associated with an extensive retrogression of the vessels in the fetal coverings. Moreover, it is also necessary to take into account the influence of senile involution, in the numerous cases of lithopedion which have been reported in middle-aged and even very old women.

Under the influence of this vascular degeneration, the circulation is apt to lessen especially early and thoroughly in the innermost layers of the fetal envelope, in the contact-zone between

the maternal and the fetal tissue, which for some time possessed the character of granulation-tissue, and therefore retains a tendency to cicatricial contraction.

Proportionately, deposits of lime are seen to occur, first at the internal boundaries of the maternal enveloping tissue, while the calcification only gradually involves also the external layers of the fetal capsule. This serves to explain the not uncommon arrangement in layers (stratification) of the lime-shell. It also explains, according to Kieser, the fact that in cases of complete calcification of the fetal capsule there usually still exists an outermost vascularized tissue-layer, free from calcium.

After an inflammatory process, penetrating from the maternal envelopes into the dead fetus, has established a communication between the two, the vascularized connective-tissue substance in the dead fetal tissue undergoes the same fate as the parietal tissue of the walls. Contraction of scar tissue follows, with narrowing and obliteration of vessels, and after these retrogressive processes have run their course, lime begins to be deposited.

In a case observed by Kieser, of a lithopedion which was still carried in the abdominal cavity fourteen months after the death of the fetus, large collections of lime were found only in the facial region. The fetus, in this instance, was surrounded by a connective-tissue membrane, which was supplied with vessels by way of the adherent omentum, and which was widely adherent to the surface of the fetus. Small deposits of lime could be demonstrated, by microscopical examination, in other localities in the superficial layer of the body. These small deposits, without exception, were situated within the maternal connective tissue which had penetrated into the fetus, usually only in its deeper layers, more particularly at the tip of the wedge-like processes of the new tissue, which were pushed out into the subcutaneous layer. The small lime foci were often found lying in sharply outlined gaps of the subcutaneous layer, giving the impression of dilated capillaries.

In the further course of the process the dead fetal tissues themselves may also undergo calcification. This can take place, however, only in the immediate vicinity of the organizing maternal tissue, and still within the field of efficiency of the maternal juices.

The apparently free, genuine lithopedions originate in the same manner, according to the author quoted. After the fetus,

which has been studded with lime deposits from the penetrating maternal tissue, comes to be very old, it may happen that the maternal tissue contained in the fetus undergoes, as a whole, a retrogressive metamorphosis, terminating in calcification. The originally solid connection of these tissue-processes with their matrix, the maternal enveloping layer, in the meantime becomes again loosened.

This mechanism, together with the fact that the penetration of the maternal granulation-tissue into the fetus often takes place only in circumscribed localities, rather than large surfaces, accounts for findings such as those described by Wyder (*Archiv. f. Gyn.*, vol. xvii, p. 2541), and quoted by Kieser. In this instance a very old lithopedion presented flat islands of calcium at the internal surface of the lining membrane, interpreted as fetal membrane, to which corresponded foci of calcification in the skin of the fetus, some penetrating more deeply. The skin between these foci was unchanged, covered with lanugo, and only loosely applied to the sheath.

Kieser is convinced that almost all cases of peripheral calcification of the fetus originate in the manner described above. The lining membrane itself, whose tissue-processes form the basis or at least the starting-point of the calcification within the fetus, may remain free from coarse calcium deposits. Even when there is no closed envelope around the fetus, there always exist partial adhesions to the omentum, etc., from which the maternal tissue distribution within the peripheral parts of the fetus, which precedes the calcification, may take its origin.

Kieser holds that there are no conclusive proofs of a mode of calcification and crust formation derived from the vernix caseosa, as assumed by Küchenmeister. He does not deny that from the fluid which surrounds the living fetus lime salts may become deposited upon the same after its death; he believes, however, that such a deposit amounts to no more than a slight finely granular precipitate, of the character described in certain cases.

Lime salts may also be precipitated from other fluids which for a long time surround a necrotic, more or less mummified or disintegrated fetus, as, for example, in chronic suppuration in the fetal membranes. These lime salts may encrust or even impregnate portions of the fetus, which accounts for the frequently reported findings of similar material, lime-encrusted skeletal fragments, in perforations of a suppurating sac.

Even the impregnation of the entire fetal body with lime

salts, a true petrification as far as the core, will have to be admitted as possible under the above-described conditions. Kieser holds this view, and also states that this is most likely to occur in a fetus that has perished at an early stage of development. A petrified fetus of this kind is cited as being preserved in the Würzburg Women's Clinic.

Kieser calls attention to the fact that, besides a dead fetus that has been carried for a considerable length of time, with or without calcification of the fetus or its coverings, deposits of lime, sometimes very abundant, are usually found in the necrotic placenta. The deposits in such case are free within the intervillous spaces, in the form of loose crumbling masses, and undoubtedly derived from the maternal circulation in these spaces, which very gradually subsides after the death of the fetus. Foci of calcification may or may not be simultaneously present in the wall of the fetal envelope.

The occurrence of a true ossification, instead of simple lime-impregnation, does not seem to Kieser to have been proved.

The remarkable state of preservation of lithopedions is accounted for by Kieser as due to the presence of two conditions, viz., freedom from microorganisms, and prompt dessication of the fetal cadaver. Softening of the cadaver from within and from without is thereby prevented, and a state of dry necrosis is brought about, which alone permits a conservative reaction on the part of the organism of the host. Microscopical examination serves to show that the preservation concerns only the solid and more highly differentiated structural elements, the muscles as well as the connective tissue and elastic fibers. Since these form essentially the frame-work of all organs, the external configuration of the organs is retained. The cellular tissue-constituents, on the other hand, undergo the characteristic changes of dry necrosis, in such a way that the cellular substance shrinks, or undergoes granular disintegration.

Strauss (*Zur Kasuistik und Statistik des Lithopedions, Archiv. f. Gyn.*, vol. lxviii, H. 3, 1903) contributes a personal observation on a case of lithokelyphos, according to Küchenmeister's classification, and reviews the literature of the subject from 1880 (up to the time of Küchenmeister's article) to 1900. He collected eleven cases of lithokelyphos, six cases of lithokelyphopiedion, and twenty-one cases of lithopedion.

Strauss believes lithopedion to be the most frequent formation, as it requires the fewest conditions for its occurrence, and is

rendered possible by the fact that the most common outcome of extrauterine pregnancy consists in rupture of the sac.

The frequency of lithopedion in extrauterine pregnancy is given by Schrenck (*Ueber ectopische Gravidität*, Inaugural Dissertation, 1893) as 1.8 per cent., or eleven among 610 cases. Schauta (*Beiträge zur Casuistik, Prognose und Therapie der Extrauterin-gravidität*, Prag, 1891) found nine lithopedions among 626 cases, or 1.5 per cent.

CASES FROM 1900-1911.

Taking up the subject where Strauss left it, I have reviewed the cases published from 1900, inclusive, to the present time. No attempt has been made to classify the cases according to manner of calcification, that is, as true lithopedion, lithokelyphos, and lithokelyphopedion.

1. Hennig (*Centrbl. f. Gyn.*, No. 5, p. 159, 1900): Presented before the Obstetrical Society, Leipzig, November 20, 1899. Lithopedion, intrauterine. No details.

2. Bryant (*Guy's Hospital Reports*, vol. lv, 1901): Acute intestinal occlusion, through adhesion of intestinal coils with a lithopedion, found at autopsy, Carrier, thirty-seven years of age. Lithopedion size of a five months' pregnancy. Knuckles of small intestine were adherent to the lithopedion in two localities.

3. Slajiner (*Centrbl. f. Gyn.*, No. 22, 1901): Carrier, thirty-one years of age. According to the history and local findings the diagnosis was extrauterine pregnancy, with dead fetus. Laparotomy. Fetus found to be covered with omentum, forming some adhesions. Attached to placenta only by sclerotic umbilical cord. Fetus of male sex. The entire skin looked as if it had been tanned, while the body was fairly well rounded throughout. In several places the skin presented yellowish-white streaks, which were shown microscopically to be deposits of lime in and under the skin. Small calcium deposits were found in the adhesions, and at the points where these had been situated. The superficial skin layers were unchanged, but the deeper layers, especially the subcutaneous cellular tissue, presented numerous heaps of granular lime, which yielded the typical microchemical reactions. The outer subcutaneous cellular tissue contained numerous fat crystals. The muscular layer showed no microscopical changes.

4. Roster (*Centrbl. f. Gyn.*, No. 28, 1901, page 823; also *Trans. Toscana Obstetrico-Gynecol. Soc.*, Florence, meeting, June 6, 1901): Presentation of radiograph of a case of lithopedion.

5. Van der Linder (*Jour. d'Accouchement*, No. 38, 1902; also *Jour. de Chir. et Annual d. l. Soc. Belge de Chir.*, No. 11, 1902): Lithopedion, corresponding to the end of pregnancy, carried

nearly twenty-two years. It had entered the abdominal cavity through tubal rupture, and had here continued to develop. The woman had been treated at the time, twenty-two years ago, for abortion, but the fetus had not been found. During all these years her health was good until two years before, when she began to suffer from abdominal disturbances. Celiotomy was performed, revealing the lithopedion lying free between the coils of the intestine, and adherent to the omentum, with its entire right side. There was no trace of placenta, umbilical cord, or fetal membranes.

6. Kessler (*Gesellschaft, f. Geburtshilfe u. Gynaek.*, Berlin, meeting of February 14, 1902. *Centrlbl. f. Gyn.*, No. 13, 1902): Specimen of lithopedion demonstrated.

7. Amann (*Verhandlg. d. x. Versammlung d. dtsch. Ges. f. Gyn.*, Würzburg, June 3-6, 1903. *Centrlbl. f. Gyn.*, No. 27, 1903): Demonstrated, among other specimens, a lithopedion and a lithokelyphopedion.

8. Rosthorn (Heidelberg), at the same meeting (op. cit.), presented a specimen of *lithokelyphos interstitialis*.

9. Brewis (Edinburgh Obstetrical Society. *Scottish Med. and Surg. Jour.*, February, 1904): Demonstration of lithopedion, obtained at autopsy, which had remained forty-one years in the abdominal cavity.

10. Keitler (*Geburtshilf. Gynaekol. Gesellschaft*, Wien, meeting of November 10, 1903. *Centrlbl. f. gyn.*, No. 9, 1904): Demonstration of a fetal sac, with a mature fetus, which had been carried for twenty-two years, by a woman more than fifty-five years of age. Sac partly calcified—lithokelyphos.

11. Martin (*Ein Lithokelyphos*; inaugural Dissertation, Griefswald, 1904): Lithokelyphos, found at autopsy on a paralytic woman of seventy years of age. Size of ostrich egg. Inside the calcified sac was a well preserved fetus. The fetal parts contained no lime deposits.

12. Haultain (A Case of Lithopedion Forty-one Years in the Abdominal Cavity.—*Jour. of Obst. and Gyn. of the British Empire*, vol. vi, 1904): Patient, seventy-one years of age, was pregnant at the age of thirty, but had never been delivered of a child. The abdominal swelling remained for some years, then gradually diminished in size. She died suddenly of heart disease, and autopsy revealed a calcified fetus, to which the uterus, which was atrophied, was adherent. The normal configuration of the fetus was preserved to a remarkable degree. The tissues were contracted and calcareous on the limbs, but on the back, scalp, and breech they seemed of normal thickness.

13. Lumpe (*Monatschrift. f. Geb. u. Gyn.*, vol. xxii, 1905): The patient was a widow, sixty-four years of age, in whose case a tubal pregnancy, with rupture about the seventh month, and secondary abdominal pregnancy, with formation of a lithopedion, were successively removed by laparotomy. The fetus of seven months had entered the abdominal cavity, leaving not only the

pregnant tube, but also the fetal membranes. This pregnancy dated about twenty-five years back. The right tube, and both ovaries, were normal in proportion to the age.

14. Bürger (Vienna Obstetrical and Gynecological Society, meeting of November 8, 1904. *Centrbl. f. Gyn.*, No. 19, 1905): During operation for cervical cancer by means of the modified vaginal method, the right adnexa were found to be embedded in extensive adhesions, in the midst of which could be palpated a small hard body. This proved to be a lithopedion. There was nothing in the patient's history to suggest an old tubal pregnancy, though it was supposed that this had occurred.

15. Herlitzka (*Centrbl. f. Gyn.*, No. 39, 1905): The patient, forty-four years of age, gave a history of eleven pregnancies, including four abortions. The last confinement was four years ago. For two years she had noticed a resistance in the lower left side of the abdomen, which at first caused no disturbance, but later gave rise to slight pain. Examination by palpation demonstrated a tumor of stony hardness, the size of the hand, in the left iliac fossa. The diagnosis, by exclusion, was made of old tubal pregnancy, with mummified fetus. This was confirmed by laparotomy. The extirpated fetus proved to be a true lithopedion.

16. Fothergill (North of England Obstetrical and Gynecological Society, meeting of November 17, 1905. *Jour. of Obst. and Gyn. of the British Empire*, ix, 1906, page 67): Lithopedion, successfully removed from a patient thirty-five years of age. The left tube showed no definite sign of having been ruptured, but its surface was roughened by the remains of adhesions separated during the operation. The specimen was found to consist of the bones of a fetus of about five months, compacted into a rounded mass and to some extent infiltrated with calcareous salts. It was partially covered by a thin, more or less calcified, membrane. The ribs, scapulæ, iliac bones, and the long bones of the limbs were easily recognized. This pregnancy had ended seven years previously.

17. Beede, S. C. (*Surg., Gyn. and Obst.*, September, 1906, page 374): Lithopedion, removed from a woman fifty years of age, who gave a history of pregnancy dating back more than nineteen years.

(Beede, believing that some estimate of the frequency of this condition would be of interest, addressed letters of inquiry to fifty representative Western surgeons. Forty replies were received, reporting in all eighteen cases. Only twelve of these were undoubted cases of lithopedion, the others being macerated products, or of uncertain origin. Of these twelve, four had developed to term, one to eight months, one to six months, one to four months, three to two or two and a half months, and two not stated. Two had remained in the abdomen twelve years; as to the others, the time was unknown or not stated.)

18. Wallart (*Zeitschrift f. Geb. u. Gyn.*, vol. lix, H. 2, 1907):

Lithopedion, found at autopsy of woman eighty-five years of age. It was free in the abdominal cavity, where many adhesions had formed with the omentum and a coil of intestine. The age of the calcified fetus corresponded to the fifth month. No anamnesis was obtainable, but if the cessation of the menstrual periods is assumed to have occurred at the age of forty-five, the presumptive age of the lithopedion must have been at least forty years. Changes at the left tubal end, and especially the absence of recognizable portions of the left ovary, suggested a tubo-ovarian pregnancy.

19. Falk (Berlin), (*Centrbl. f. Gyn.*, No. 43, 1907, page 1308): Lithopedion from an ovarian pregnancy. The specimen was not obtained at operation, but at the autopsy of a woman seventy-five years of age, who had carried the lithopedion for about thirty years, during which time she had given birth to a child at term. The diagnosis had been made long before, but the patient had never consented to an operation. The specimen showed the right ovary transformed into a tumor the size of a man's head, with deposits of calcium in the walls. The right tube was perfectly free and visible as far as the fimbriated end in front of the tumor; behind the tube, the ovarian ligament passed close to the tumor. In cross-section, a child nearly at term was seen in a crouched position, a little to the middle line. The head, vertebral column, extremities, viscera, female genitals, placenta, and umbilical cord, were all plainly visible.

20. v. Holst (*Centrbl. f. Gyn.*, No. 15, also No. 34, 1907): Lithopedion, obtained by laparotomy, from a woman, who had carried it for six years. The patient recovered from the operation. The structure, position, and size of the various skeletal parts could be very distinctly seen on radiographs. The tumor occupied the fimbriated end of the left tube, and was markedly adherent to the pelvic floor. The specimen was analyzed and examined microscopically. The sternum was found to be entirely cartilaginous; the vertebral column consisted of numerous pieces of cartilage and bone. It was noteworthy that the cells still took in part a very good stain, in the vertebral bones and cartilages. Evidently these cells still survived, and the bone-formation from cartilage was not yet entirely completed. Instead of bone-marrow, there was an entirely fibrous connective-tissue, which was probably developed from the preserved endosteum, whereas the free marrow-cells had entirely disappeared.

21. Hayd, H. E. (*Am. Jour. of Obst.*, vol. lvi, 1907, page 657): Lithopedion or lithokelyphopedion, twenty-two years old, successfully removed from a woman sixty-four years and seven months of age. Reported before the American Association of Obstetricians and Gynecologists, September 17-19, 1907. The abdominal tumor, which the patient had carried for many years without inconvenience, had to be removed on account of progressive weakness, severe pains, and a bad general condition. On operation a stony mass weighing over two pounds

was shelled out of the left broad ligament, without any bleeding, and the patient made a good recovery from the operation, but died a few weeks later from pleurisy. There was a history of pregnancy and missed labor when the patient was thirty-five years old. The specimen was globular in shape, surrounded by a dense hard covering about as thick as thin cardboard. After sawing through the outer envelope the fetus was seen firmly bent upon itself, with the arms and legs like flattened bands. The calcified membrane was firmly adherent to the head and spine and back of the legs and arms. The abdomen, chest, side of head, arms, legs, and fingers, even the fingernails, were in perfect preservation.

22. Elbrecht, in discussing the above case, reported a case of tubal abortion, with complete detachment of the fetus from the placenta at six months, resulting in omental attachment and beginning lithopedion.

23. Price, in discussing the same paper, recalled a large specimen of this nature, with a foot protruding from the sac.

24. Morehouse and Griswold (*Jour. Am. Med. Assn.*, January 19, 1907, page 222): Lithopedion, carried twenty-six years or more, patient sixty-two years of age. Removed by laparotomy. The specimen was a complete skeleton of a fetus of five or six months, flexed on itself, complete in every respect, even to the preservation of the bones of the hands. The specimen is now in the museum of Rush Medical College.

25. Weibel (*Centrbl. f. Gyn.*, No. 37, 1908, page 1227): Lithopedion after ovarian pregnancy; obtained from a woman fifty-seven years of age. History of extra-uterine pregnancy twenty-seven years before. Laparotomy, on account of hard, immovable tumor, size of man's head, in left half of abdomen. The specimen consisted of the placenta, the very well preserved nine months' fetus, and the closely adherent membranes. Deposits of lime were demonstrated in individual organs (liver, kidney, lungs, muscle and skin), being absent from others.

26. Smith, J. W. (*Jour. Obst. and Gyn. of the British Empire*, March, 1908, page 180): Lithopedion, retained in abdominal cavity for fifteen years and a half, after rupture of a tubal pregnancy at the end of the sixth week. Carrier forty years of age. The presence of the lithopedion resulted in acute intestinal obstruction. The patient died some hours after removal of the generally adherent lithopedion and relief of the intestinal obstruction. The specimen weighed one pound and five ounces, the whole being hard and calcified. The placenta, though calcareous, was not very hard, and at more than one point there was a tendency to crumbling. The survival and calcification of the placenta appears to be of rare occurrence, as in many of the recorded cases of lithopedion no mention is made of traces of the placenta having been found.

27. Staniszewski (*Centrbl. f. Gyn.*, No. 48, 1909, page 1646): Lithopedion, removed by operation, demonstrated before the

gynecological meeting of the Warsaw Medical Society, November 27, 1908.

28. Schauta (*Centrlbl. f. Gyn.*, No. 29, 1909, page 1023): Lithokelyphos, removed by operation from a patient thirty-three years of age, who gave a history of seven confinements. The disturbance which led to operation began eighteen months before, at which time the patient failed to menstruate, and considered herself pregnant. In the fifth month she felt distinct fetal movements, and finally neared the time of full term. About this time she fell on the staircase, and had labor-pains, with much discharge of water from the vagina. Five weeks later a membrane was passed from the uterus. The abdomen retained the same circumference, but seemed to become progressively harder. The patient then remained free from symptoms for four months. After fifteen months the periods returned. The specimen in this case is noteworthy for the reason that the intrinsic portion of the tube is entirely undeveloped, so that the pregnancy actually originated from the ampullary portion of the tube. The ovary was not involved in the formation of the capsule. The capsule, examined microscopically, showed infiltration with lime-salts. (Sections of this were projected upon the board at the meeting of the Vienna Obstetrical and Gynecological Society, March 2, 1909.)

29. Balfour (*British Medical Journal*, No. 2, 1909, page 1615); also *Jour. of Obst. and Gyn. of the British Empire*, Vol. xvii, 1910, page 247): Lithopedion, removed by operation, from a Hindu woman, thirty-two years of age, who had carried it three years. The specimen consisted of a nearly calcified fetus, nine inches in length, attached by long adhesions to the omentum and anterior abdominal wall. There were no remains of placenta. The patient made an excellent recovery from the operation.

30. Hall (*Jour. Obst. and Gyn. of the British Empire*, xvi, 2, 1909; *Lancet*, i, 1909, page 1380): Lithokelyphos, removed by operation from a woman forty-five years of age. She had been married twenty-one years, had had no children, but gave a typical history of ruptured tubal pregnancy soon after marriage, when the tumor for which she was operated appeared. The tumor was found to be a calcified spherical mass, as large as a child's head, which, on section, proved to be a perfect fetus encased in a calcareous shell.

31. Schuhl (*L'Obstetrique*, xiv, 1909, page 222): Lithopedion retained nearly twenty-seven years, carrier fifty-five years of age. In spite of the retention of this seventh months, calcified fetus the patient had four normal uterine pregnancies, the first of which was a forceps delivery, the others terminating spontaneously. (This observation was published, after the first of these confinements, in Schuhl's *These de Nancy*, 1883.)

32. Van der Veer and McCabe (*Albany Medical Annals*, No. 4, 1910): Lithopedion, autopsy findings; carried thirty-five

years; carrier, sixty-five years of age. Lithopedion entirely free in abdominal cavity, except for slight adhesions of intestine and peritoneum. There was one normal childbirth three years before the pregnancy corresponding to the lithopedion, and another three years later. The diagnosis was made in this case in 1909, by Dr. McCabe, and consent obtained to perform an autopsy when occasion offered.

33. Weidlich (*Centrlbl. f. Gyn.*, No. 20, 1910): Lithopedion, in the urinary bladder, of patient forty-three years of age. The patient had missed her menstrual periods during five months, six years before. She suddenly became ill with very severe colicky pains and fainting spells, and was treated for several months for peritonitis. Severe gastritis, with intolerable colicky pains for a year past, undoubtedly due to a tumor, the size of a nut, which projected into the bladder. The bladder was opened by way of the vagina, when the diagnosis of lithopedion was rendered possible by the removal of the skull bones. In the midst of the work the small bones slipped away from the finger, and disappeared into a hole. Laparotomy was performed, under the assumption that the bladder had been perforated. It was found that a coil of small intestine communicated with the bladder, the lithopedion being contained partly in the bladder and partly in the intestine. Healing took place, and the patient made a perfect recovery.

34. Fraenkel (*Centrlbl. f. Gyn.*, No. 35, 1910, page 1169): Lithopedion. A twelve to fourteen weeks' fetus escaped, with the placenta, into the abdominal cavity, where it remained for over one year. They were found to be closely adherent to the intestine and the omentum, with abundant new formation of blood-vessels, the fetus itself having become transformed into a true lithopedion.

35. Martin (*Annals of Surgery*, August, 1911): Lithopedion. Reported before the New York Surgical Society, April 12, 1911. The patient, thirty-nine years of age, had been a widow four and a half years. During the last year of her husband's life she believed herself to be pregnant, and at the end of the fourth month took measures to terminate the pregnancy by the introduction of a stylet and the injection of kerosene into the uterus. Moderate hemorrhage followed. Since that time she had had attacks of pelvic pain, which had recently become more severe. Upon vaginal examination a hard mass could be felt in the posterior culdesac. X-ray examination showed an indistinct shadow low down in the pelvis. Laparotomy revealed a hard mass, the size of an orange, on the right side, adherent to the uterus, which was normal in size. This tumor was composed of an adenomatous mass and the skeleton of a fetus, apparently of the fourth month. The fetus had apparently been in the abdominal cavity for four years.

36. Bainbridge.

34 GRAMERCY PARK.